UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,460	09/15/2003	Luc Minnebo	GN02103	1777

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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>03 March 2008</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>4-19</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>4-19</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

U.S. Patent and Trademark Office
PTOL-326 (Rev. 08-06)   Office Action Summary   Part of Paper No./Mail Date 20080330

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/03/08 has been entered.

Response to Amendment

Applicant argues that Klassen does not discloses either a vector error diffusion or scalar error diffusion in image processing.

In reply, Klassen discloses or suggests either separately diffuse the error associated with each color (one dimensional) (column 3, lines 19-29) or multidimensional vector error diffusion (column 4, lines 5-15) in image processing.

Applicant argues that He does not discloses for every output pixel an output pixel value combination of cluster of pixels is changed as a function of a modified input pixel to which an error was added.

In reply, He discloses for every output pixel an output pixel value combination of cluster of pixels (e.g., the output halftone value g(m,n), column 6, lines 42-47) is changed as a function of a modified input pixel (e.g., modified pixel value u(m,n), column 6, lines 42-47) to which an error was added.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In particular, the amended limitation of claim 16: **"to map input pixels having input vectors in an input image one-to-one onto output pixels having output vectors in an output image"** is not defined in the specification because to have input pixels mapping one-to-one onto output pixels the following condition need to satisfy according to definition of one-to-one function in Mathematic: if input pixel x1 is not equal to input x2, then output pixel f(x1) is not equal f(x2). This condition is not defined in the specification.

Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In particular, the amended limitation of claim 16: **"to map input pixels having input vectors in an input image one-to-one onto output pixels having output vectors in an output image"** is not defined in the specification because to have input pixels mapping one-to-one onto output pixels the following condition need to satisfy according to definition of one-to-one function in Mathematic: if input pixel x1 is not equal to input

x2, then output pixel f(x1) is not equal f(x2). This condition is not defined in the

specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 4-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over He

et al. (He) (US Patent 7,031,025) in view of Klassen et al. (Klassen) (US 5,621,546).

With regard to claim 16, He discloses a error diffusion vector method to map

input pixels having input vectors in an input image one-to-one onto output pixels having

output vectors in an output image (e.g., the dot density control LUT 122 and dot size

control LUT 124 map each input pixel x(m,n) to a specific desired value, column 5, lines

31-33), the method comprising the steps of: determining a modified input pixel vector

(e.g., the modified pixel value u(m,n) (vector), column 6, line 45) based upon: an input

pixel vector (e.g., input pixel value X(m,n) (vector), column 6, lines 43-44); and a

fraction of an error vector (e.g., a quantizer error value d(m,n) (vector), column 6, line

47-50); determining for said modified input pixel vector a quantization set consisting of

quantization vectors, each quantization vector (e.g., modified pixel value u(m,n), column

6, lines 42-47) corresponding to an available output pixel vector combination of a cluster

of pixels (e.g., the output halftone value g(m,n), column 6, lines 42-47), said output pixel

vector combination resulting in a density value change in said output Image (e.g., the output halftone value g(m,n) (vector), column 6, lines 47-50; column 7, lines 16-28); selecting a quantization vector out of said quantization set based upon said modified pixel vector (column 6, lines 47-50); and calculating an error vector that depends on the modified input pixel and the selected quantization vector (e.g., a quantizer error value d(m,n) (vector), column 6, lines 47-50), wherein: the error vector takes into account the density value change of an area in the output image corresponding to more than one pixel (column 6, lines 50-52).

He differs from claim 16, in that he does not explicitly show error diffusion vectors in N-dimensional.

Klassen discloses error diffusion vectors in N-dimensional (column 4, lines 5-15).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified He to include error diffusion vectors in N-dimensional as taught by Klassen. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified He by the teaching of Klassen to use error diffusion method in different color space.

With regard to claim 4, Klassen discloses wherein N = 1 corresponding to one-dimensional vectors of scalar grayscale image (e.g., each color component for 1-dimensional space, column 4, lines 5-15).

With regard to claim 5, He discloses wherein said cluster comprises at least two pixels (column 7, lines 45-47).

With regard to claim 6, He discloses wherein the pixels corresponding to the area in the output image coincide with the pixels of said cluster (column 7, lines 16-28).

With regard to claim 7, He discloses wherein said density value changes are taken into account in determining said available calculated quantization values of said quantization set for said pixel (column 6, lines 42-50).

With regard to claim 8, He discloses wherein said density value changes are taken into account in determining said modified pixel value for said pixel (column 6, lines 42-50).

With regard to claim 9, He discloses wherein the clusters of pixels are unequal in size for at least two possible quantization values (column 7, lines 16-28).

With regard to claim 10, He discloses wherein the cluster size is adjusted depending on the input pixel value (column 2, lines 31-34).

With regard to claim 11, He discloses wherein the cluster size is adjusted depending on the local contrast of the pixels surrounding the input pixel (column 1, line 65 - column 2, line 1).

With regard to claim 12, He discloses wherein said method for error diffusion halftoning further comprises a halftone dot distribution alteration step in low and high intensity image regions (column 3, lines 5-17).

With regard to claim 13, He discloses wherein the method for error diffusion halftoning is a multilevel halftoning method (column 5, lines 54-55).

With regard to claim 14, He discloses wherein the output value of the pixel is set to the corresponding minimum or maximum output value if the input pixel value is the minimum or maximum possible input value (column 6, lines 21-40).

With regard to claim 15, He discloses wherein at least one of the color separated images is halftoned using a method according to claim 1 (column 5, lines 9-10, lines 18-20). Here, different kind of printers using different ink colors for printing of dots by using the halftoning method of He.

With regard to claim 17, He discloses wherein the overlap between halftone dots in different separated images is taken into account (column 8, line 65 – column 9, line 18).

With regard to claim 18, He discloses in which the plural separated images represent plural color separations (column 5, lines 6-20). Here, He also discloses a color printer for the invention.

With regard to claim 19, He discloses in which the plural separated images represent plural color separations (column 5, lines 6-20).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang N. Vo whose telephone number is 5712701121. The examiner can normally be reached on 7:30AM-5:00PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, King Y. Poon can be reached on 5712727440. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published

applications may be obtained from either Private PAIR or Public PAIR. Status

information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you

have questions on access to the Private PAIR system, contact the Electronic Business

Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO

Customer Service Representative or access to the automated information system, call

800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quang N Vo/
Examiner, Art Unit 2625
/King Y. Poon/
Supervisory Patent Examiner, Art Unit 2625